Broadband Adoption Analysis

Rhode Island Economic Development Corporation

February 29, 2012

c squared strategy

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Executive Summary

Background and Objective

Background

- Spurred by the President's focus on expanding broadband access, there have been multiple efforts over the past two years dedicated to understanding broadband coverage and adoption at the ***national*** level
- These primarily include studies by the U.S. Census Bureau, the National Telecommunication & Information Administration (NTIA), and Pew Research Center
- However, little analysis exists regarding broadband adoption at the ***Rhode Island*** level

Objective

The ***Rhode Island Economic Development Corporation (RIEDC)*** has engaged **C Squared Strategy** to help it better understand broadband coverage and adoption within the State of Rhode Island, particularly among its urban households. This objective includes:

- Leveraging the data and findings from the Census Bureau and from the NTIA and Pew national studies
- Gathering qualitative insights on adoption behaviors from Rhode Island urban communities

The RIEDC intends to use this information as a baseline for further analysis and initiatives to improve broadband adoption levels throughout the State.

Report Highlights

- Broadband adoption in the country has improved dramatically over the last ten years, with 68% of households currently utilizing broadband internet access. Yet, approximately 32% of households still do not access the internet.
- The NTIA found that the primary reasons for lack of broadband subscriptions were primarily due to: 1) lack of need or interest, 2) lack of affordability and 3) inadequate computer equipment.
- There are six highly correlated attributes that collectively help shape the likelihood of a household using broadband at home – ethnicity, income, education, household size, school-age children, and whether the householder is foreign born. Differences in these attributes provide some insight into broadband challenges but not necessarily the entire story.
- Rhode Island has a household broadband adoption rate of 71%, which is slightly higher than the national average of 68%.
- As well, Rhode Island has wireline and wireless broadband coverage of 100%, one of the highest in the country.
- 75% of Rhode Islanders who do access broadband at home do so from a home computer, which is very similar to the national average of 77%. While Rhode Island has a lower percentage (16%) of households with handheld devices and computers, the rise in smartphone usage is growing.

Report Highlights continued

- African-Americans and Hispanics continue to lag the national adoption rates of Asians and Whites, though the gap is closing with gains of almost 22% among targeted segments within the last two years.
- In the Northeast region, 24% of Rhode Islanders earn less than $25,000 per year. The combination of low-income households with householders without a high school degree present significant adoption challenges to Rhode Island's six largest cities, particularly Providence, Pawtucket and Woonsocket.
- Rhode Islanders in low-income communities expressed a strong desire to connect and interact with the internet despite not having the resources to do so. This was contrary to Pew Research and NTIA data which noted ***relevancy*** as the main factor impacting internet adoption.
- Beyond expense and access to a computer, Rhode Island study participants indicated the fear of identity theft as a significant barrier to broadband adoption.
- Rhode Islanders in urban communities believe that access to job, health and ecommerce information was important to them. Combined with the ability to take online coursework, conduct DMV transactions and schedule medical appointments, these activities could increase the likelihood of their use of broadband services.

Methodology

The methodology for this report focused on collecting and analyzing data from four core data sources:

- U.S. Census Bureau 2008-2010 American Community Survey (ACS), 3-Year Estimates
- U.S. Census Bureau and U.S. Bureau of Labor Statistics Current Population Survey (CPS) 2010
- National Telecommunications and Information Administration (NTIA) -Exploring the Digital Nation - Computer and Internet Use at Home 2011
- The Pew Research Center Internet and American Life Project – Home Broadband 2010

From a time and resource perspective, the ACS 3-Year report was our core data source as it was released in October 2011 and provided expanded data capture for communities with populations greater than 20,000 while covering a broader range of information.

Drawing upon the 2010 CPS data, the NTIA Digital Nation study released in February 2011 and updated in November of 2011, was a critical source of adoption information. This study specifically sampled 54,000 households about their computer use and broadband internet adoption.

The Pew Center for Internet Research used a survey of 2200 adults in their Home Adoption 2010 study which we also utilized.

Methodology continued

We also worked with four urban community based organizations to conduct primary research via focus groups with 65 residents. We created specific resident profiles to understand their broadband situation and what drove and influenced their ability to go online.

We recognize that while this was a limited sample size, the data collected was helpful in highlighting key observations and directional ideas beneficial to larger audiences of similar profiles.

The four community-based organizations we worked with were:

- Cranston Public Library
- Dorcas Place – Adult Literacy
- OIC of Rhode Island, Inc. – Workforce
- Providence Housing Authority

Assumptions and Acknowledgements

Project Assumptions and Focus

- We maintained a residential household – vs. a commercial business focus .
- We maintained an urban community (job impact rationale) focus vs. a broader urban, suburban and rural analysis.
- The U.S. Census 2008-2010 ACS 3-Year data, rather than the U.S. Census 2010 decennial population survey, represented a more current view of Rhode Island demographics.
- The limited qualitative profile sample is representative of larger profile populations.
- There existed a lack of sufficient household-level broadband provider data to inform our analysis.

Acknowledgements

- Through the course of the project numerous periodicals, articles and information from the RIEDC were consulted and provided useful insights into the report.
- We would also like to acknowledge the tremendous support and contribution from Greg Bonynge of the University of Rhode Island who was invaluable in providing access and insight into the Census and ACS data as well as his geographic information systems (GIS) skill set. Also, we thank Rafi M. Goldberg, the telecommunications policy analyst at the NTIA, who was instrumental in assisting with applying the NTIA data to understanding broadband in Rhode Island.

Broadband Coverage

Rhode Island | Geographic Wireline Coverage

Eleven (11) broadband providers have blanketed Rhode Island with 97% *wireline* coverage.

- AboveNet
- Broadview Networks
- Cogent Communications
- Covad Communications Company
- Cox
- Fibertech Networks
- Full Channel
- Hughes
- Level 3/ Broadwing
- Lightower Fiber Networks
- Verizon

Source: "Rhode Island Broadband Wireline Coverage" Map, Broadband Rhode Island, November 2011.

Rhode Island | Geographic Wireless Coverage

Seven (7) broadband providers have blanketed the State with 100% *wireless* coverage.

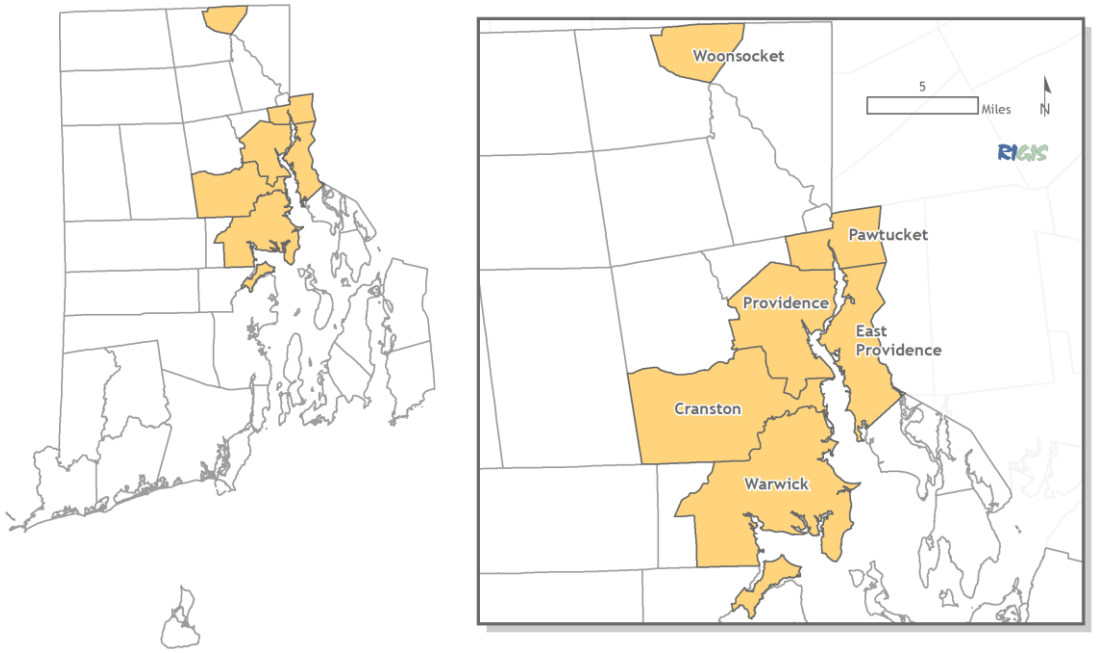
- AT&T Wireless
- Clearwire
- Starband
- Sprint
- T-Mobile
- Verizon Wireless
- Wildblue Communications

Source: "Rhode Island Broadband Wireless Coverage" Map, Broadband Rhode Island, November 2011.

Rhode Island | Six Largest Cities

The total State of Rhode Island population is 1,053,846, with the city of Providence representing 17% and thus the largest city with 178,117 individuals.

- ***Providence, Warwick, Pawtucket, Cranston, East Providence and Woonsocket*** are Rhode Island's six largest cities.
- They have populations greater than 40,000 individuals and represent ***47%*** of the total State population.
- Yet with 100% broadband coverage, the State has roughly ***30%*** of its residents ***not*** using the internet.



SOURCE: B01003 Total Population, 2008-2010 American Community Survey 3-Year

Comparative Data

NTIA Survey | Rhode Island Household Data

In October 2010, the U.S.Census Bureau (within the Economics and Statistics Administration) in collaboration with National Telecommunications and Information Administration (NTIA) significantly expanded the ***Current Population Survey*** (CPS) to include new questions on computer and broadband Internet use.

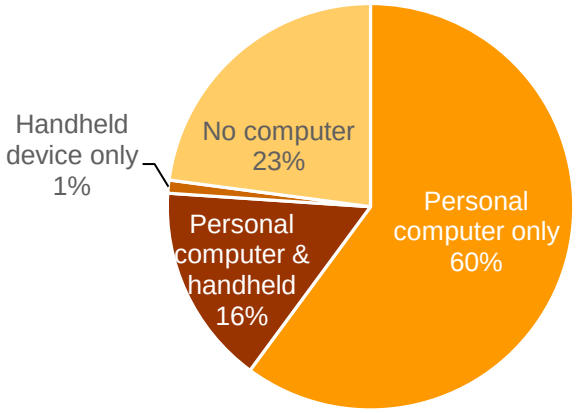
- This survey of about 54,000 households and 129,000 individuals used statistical methods to extrapolate the survey results to represent 119.5 million American households.
- There are 965 Rhode Island households within this survey. Using this national and Rhode Island data, we provide a high level analysis of RI device usage and ownership, broadband provider and broadband access. In addition, we compare this analysis to Rhode Island's neighboring states and to Rhode Island's largest cities.

Over Three Quarters of Rhode Island Households Have A Broadband-capable Device

77% of Rhode Islanders have a personal computer and/or handheld device (smartphone) capable of accessing the internet.

- 60% of Rhode Islanders have a personal computer in the home.
- 16% have both a personal computer and a broadband-capable handheld device (smartphone).
- Nearly one quarter (23%) have no hardware in the home to access the internet.

Technology in the Home

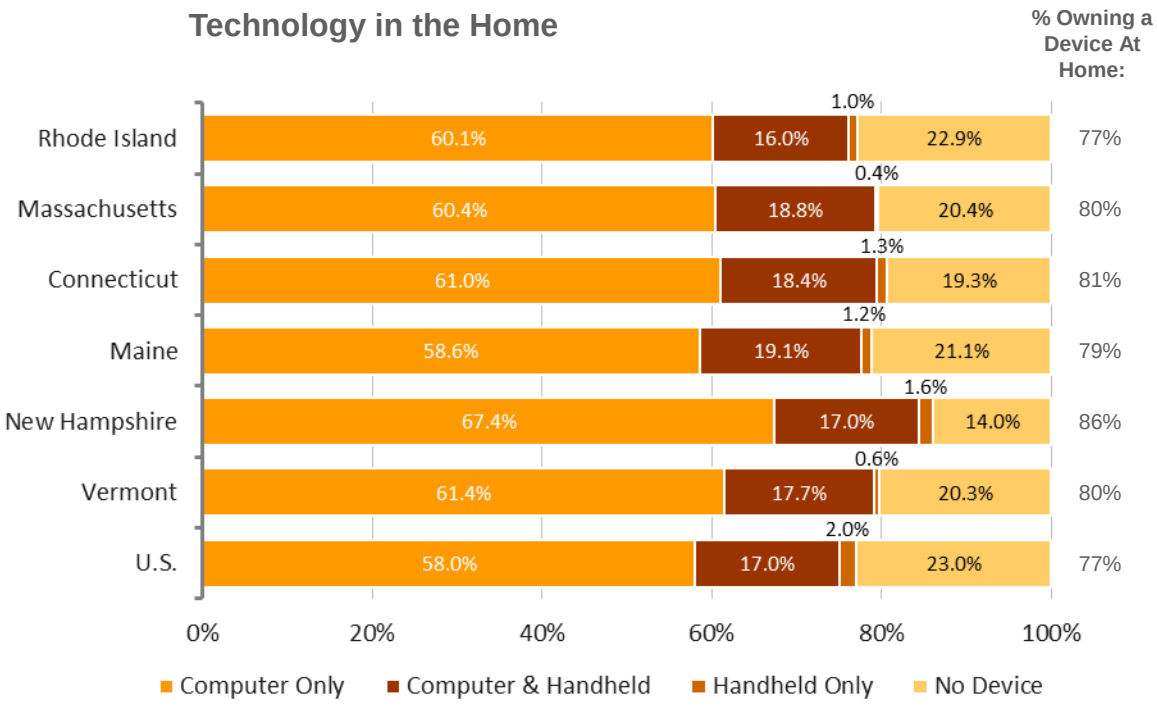


SOURCE: US Census NTIA Current Population Survey 2010

Rhode Island Device Ownership Is Similar to U.S. But Lower Than Neighboring States

Based on the NTIA sample, New England households have device ownership rates that range from 77% (Rhode Island) to 86% (New Hampshire).

- RI households with only a computer (60.1%) are lower than neighboring states, except Maine.
- RI households with both a computer and handheld device (16.0%) are below neighboring states and the U.S., in general.
- Only a small percentage of households (2% nationally) rely solely on a handheld device for internet access.



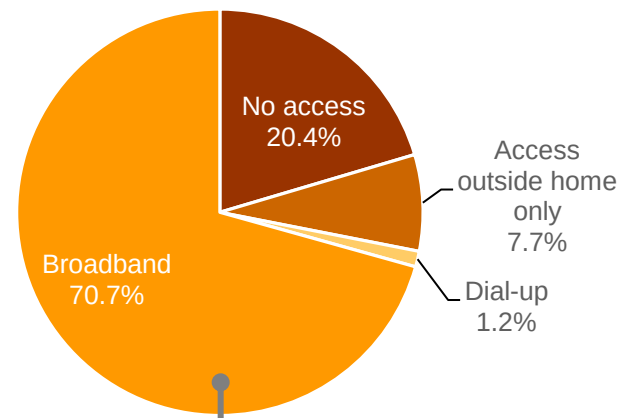
SOURCE: US Census NTIA Current Population Survey 2010

71% Of Rhode Island Households Have Broadband Access

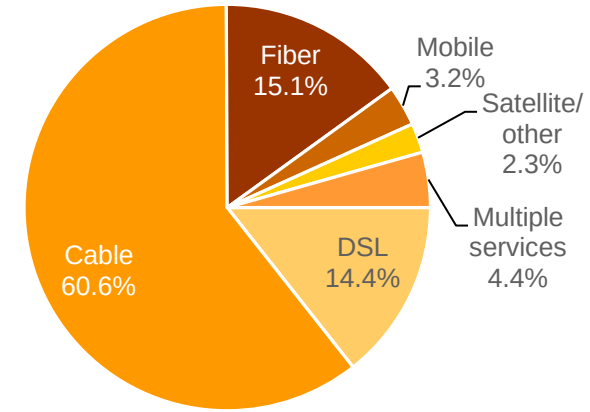
Four out of five (80%) Rhode Islanders access the internet , whether inside and/or outside the home.

- 71% have broadband access in the home while only 1% have dial-up.
- 8% access the internet only outside the home while 20% do not access the internet at all.
- The primary places where individuals access the internet are at home, schools and libraries.
- Of households with broadband, cable is the most popular service (61%), followed by Fiber (15%) and DSL (14%).

Broadband Access



Broadband Service Type

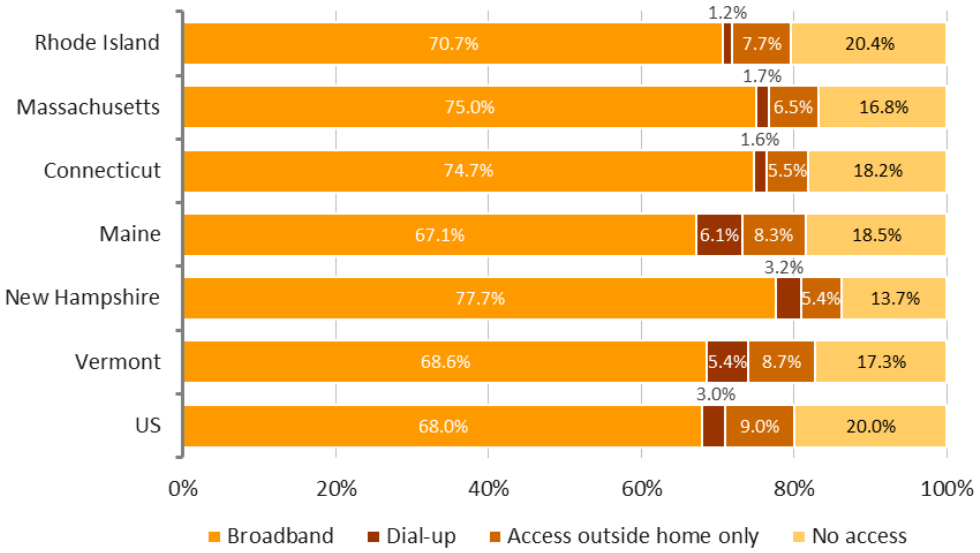


SOURCE: US Census NTIA Current Population Survey 2010

Rhode Island Broadband Adoption Is In the Middle of Other New England States

Maine has the lowest broadband adoption rate (67.1%) while New Hampshire has the highest (77.7%).

- RI's broadband adoption rate of 70.7% exceeds the national average of 68.0%.
- Few households in Rhode Island or elsewhere use dial-up.
- Between 5% and 9% of New England households do not access the internet at home but do so outside the home.
- RI has the highest percentage among New England states that do not access the internet at all (20.4%).

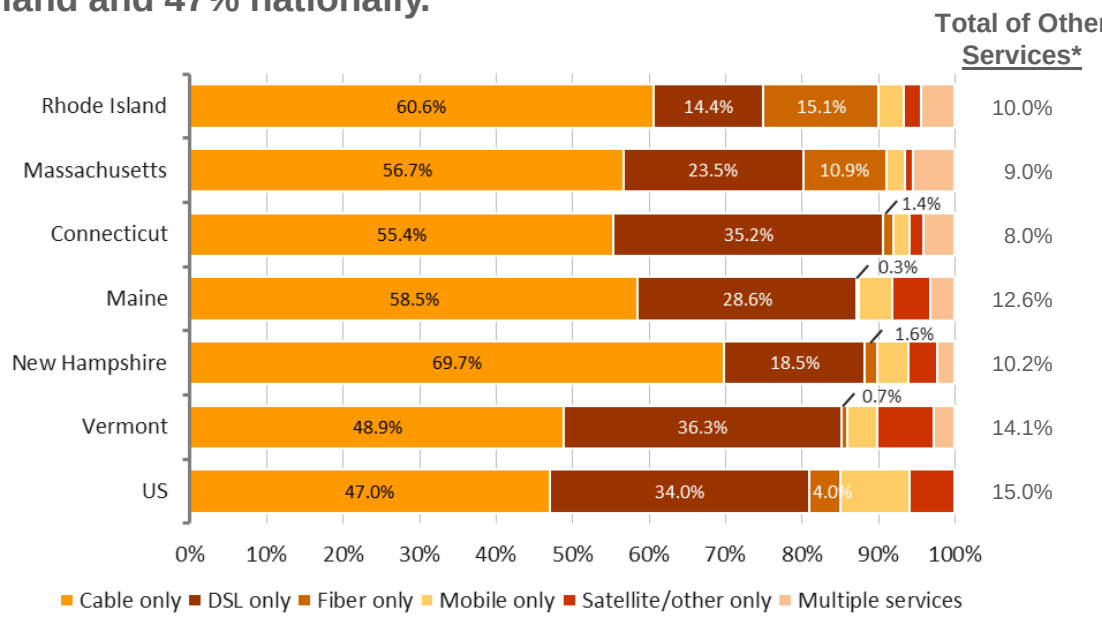


SOURCE: US Census NTIA Current Population Survey 2010

There Is A Wide Variation In Broadband Services Used

Cable is the most prevalent service among broadband adopters, commanding 49% to 70% of the broadband market in New England and 47% nationally.

- RI has the highest fiber adoption (15.1%) among New England broadband adopters.
- New Hampshire has the highest cable adoption (69.7%) while Vermont has the highest DSL adoption (36.3%).
- 2.4% to 5.5% of households in New England subscribe to multiple broadband services.



* Represents total those subscribing to Mobile only, Satellite/other only, and Multiple Services
SOURCE: US Census NTIA Current Population Survey 2010

Regional Demographics | Education

Rhode Island and its regional neighbors have a higher percentage of those with college degrees than the national average.

- Individuals with college degrees adopt broadband at ***almost triple the rate*** of those with some high school education (84% vs. 30%).
- Rhode Island tracks national educational achievement levels but among Northeastern states, has the highest percentage of residents with less than a high school degree.
- At 23% RI has ***the highest percentage of residents*** in the region who have some college experience.

		Regional View					
	RI	MA	CT	ME	NH	VT	US
Total Population (000s)	**1,054**	**6,515**	**3,561**	**1,329**	**1,316**	**625**	**306,738**
Education | Highest Level Achieved*							
< High school	15.3%	11.2%	11.7%	10.3%	9.3%	9.1%	15.0%
High school/GED	27.4%	26.3%	28.1%	34.4%	29.6%	32.0%	28.6%
Some college	23.1%	20.3%	20.9%	22.9%	22.4%	21.4%	24.3%
College degree +	34.2%	42.2%	39.3%	32.4%	38.7%	37.5%	32.1%

SOURCE: S1501: Educational Attainment 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.
* Data combines 2008-2010 3-Year American Community Survey educational attainment estimate for both 18-24 years old and 25 years of age and older

Regional Demographics | Ethnicity

Rhode Island and its regional neighbors have a large White population but a much smaller ethnic mix than the U.S.

- Asians and Whites have the ***highest rates of broadband adoption*** in the U.S. at 81% and 72% respectively.
- In the six New England States the percentage of Whites ranges from 77-94%, well above the national average of 64%.
- Similarly, the percentages of Blacks, Hispanics and Asians on a regional basis is substantially lower than the national averages (1% -12% vs. 5%-16%).
- Both CT and RI have the highest percentages of Hispanics in the region.

		Regional View					
	RI	MA	CT	ME	NH	VT	US
Total Population (000s)	**1,054**	**6,515**	**3,561**	**1,329**	**1,316**	**625**	**306,738**
Race							
▪ **White**	76.9%	76.8%	71.7%	94.6%	92.4%	94.4%	64.1%
▪ **Black/AA**	5.2%	6.2%	9.3%	1.0%	1.1%	0.9%	12.2%
▪ **Hispanic**	12.1%	9.3%	13.0%	1.3%	2.8%	1.5%	16.1%
▪ **Asian**	3.0%	5.3%	3.7%	1.0%	2.1%	1.2%	4.7%
▪ **American Indian**	0.3%	0.1%	0.1%	0.5%	0.2%	0.2%	0.7%
▪ **Other**	2.5%	2.3%	2.2%	1.6%	1.4%	1.8%	2.2%

SOURCE: DP05 Demographic and Housing Estimates 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

Regional Demographics | Income

Rhode Island households generate less income overall than those in Massachusetts and Connecticut.

- 43% of all U.S. households with incomes below $25k had broadband at home vs. 93% adoption for households with incomes of at least $100k.
- RI and its regional neighbors are above the national average for household income between $75k-$99k.
- 46% of Rhode Island households generate incomes less than $50k.

		Regional View					
	RI	MA	CT	ME	NH	VT	US
Household Income							
< $25k	24.2%	20.6%	18.3%	26.1%	17.4%	23.1%	24.0%
$25 – 49k	22.1%	19.3%	19.6%	27.2%	22.7%	25.3%	24.8%
$50 – 74k	17.9%	17.0%	17.2%	20.1%	19.4%	21.1%	18.5%
$75 – 99k	13.5%	13.2%	13.4%	12.2%	14.3%	13.1%	12.1%
$100k +	22.3%	29.9%	31.5%	14.4%	26.2%	17.4%	20.6%

SOURCE: DP03 Selected Economic Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

Regional Demographics | Education
Poverty Rate

There are degrees of regional variability of poverty rates and education with Maine, Vermont and Rhode Island households tracking closest to the U.S. averages.

- Among urban householders in the U.S. without a high school degree, only 35% had broadband at home.
- In the Northeast region, Rhode Island and Maine have the highest poverty rates ***of non-high school graduates***, though slightly below the national average.
- Vermont has the highest combined poverty rates of those with some college and college degrees.

		Regional View					
	RI	MA	CT	ME	NH	VT	US
Poverty Rate by Education Level							
< High school	23.2%	23.8%	21.9%	25.2%	16.0%	23.0%	25.6%
High school	11.1%	10.5%	9.4%	12.0%	8.6%	10.7%	12.5%
Some college	7.3%	7.8%	6.6%	8.4%	6.5%	8.5%	8.9%
College +	4.1%	3.7%	2.9%	3.5%	2.8%	4.2%	3.9%

SOURCE: S1501 Educational Attainment 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

Regional Demographics | Birthplace

Rhode Island's foreign-born population is similar to that of the U.S.

- Rhode Island has a similar profile to the US with 87% native-born and 13% foreign-born residents.
- Rhode Island and its immediate neighbors – MA and CT – have a similar percentage of foreign-born residents vs. the remaining States in the region.

	RI	Regional View					US
		MA	CT	ME	NH	VT	
Birthplace							
Born in US	87.3%	85.2%	86.5%	96.7%	94.8%	95.9%	87.2%
Foreign born	12.7%	14.8%	13.5%	3.3%	5.2%	4.1%	12.8%

SOURCE: DP02 Selected Social Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

Regional Demographics | School-Age Children

Rhode Island's portion of its households with school-age children is moderately lower within the region.

- U.S. households with one or more children were more likely to have broadband than households with no children (74% vs. 65%).
- With ***59%,*** Rhode Island has the lowest number of households with school-age children. MA and VT are also below the national average of 66%.
- CT, ME and NH have basically the same percentage of households with children as the nation.

	RI	Regional View					US
		MA	CT	ME	NH	VT	
Households with School-age Children							
▪ **School-age kids**	59.0%	61.0%	66.0%	67.0%	67.0%	64.0%	66.0%

SOURCE: DP02 Selected Social Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

City Demographics | Education

There is a wide variation of education levels amongst Rhode Island's largest cities.

- U.S. adults who possess a BA degree are likely to adopt broadband at home (82%) vs. individuals with just a high school degree (51%).
- With the exception of ***Providence,*** the five largest cities have a higher percentage of households with a high school degree than the State average.
- All five cities except ***Warwick*** fall below the State average for households with college degrees (range of 16-28%).

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Total Population (000s)	**1,054**	**178**	**83**	**80**	**71**	**47**	**41**
Education | Highest Level Achieved							
< High school	15.3%	23.7%	10.4%	19.9%	24.4%	19.9%	25.5%
High school/GED	27.4%	22.1%	32.8%	31.3%	32.0%	31.3%	33.9%
Some college	23.1%	27.7%	22.0%	20.8%	20.6%	20.8%	24.1%
College degree +	34.2%	26.5%	34.8%	28.0%	23.0%	28.0%	16.5%

SOURCE: S1501: Educational Attainment 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.
* Data combines 2008-2010 3-Year American Community Survey educational attainment estimate for both 18-24 years old and 25 years of age and older

City Demographics | Ethnicity

Rhode Island's ethnic diversity is concentrated in three of its largest cities.

- It is estimated that 57% and 55% of U.S. Hispanic and Black households, respectively, have adopted broadband service.
- Of the six cities, Providence and Pawtucket have the largest minority populations (Hispanic, Black, Asian) at ***58% and 35%,*** respectively.
- Hispanics are the largest minority population in each of the six cities, representing ***12%*** of the total RI population.
- In Providence, Hispanics are in the majority with ***39%*** of the population.

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Total Population (000s)	**1,054**	**178**	**83**	**80**	**71**	**47**	**41**
Race							
White	76.9%	38.0%	91.0%	77.8%	59.4%	82.5%	74.0%
Black/AA	5.2%	12.8%	1.5%	4.1%	16.2%	5.3%	4.5%
Hispanic	12.1%	38.9%	3.1%	10.3%	16.8%	5.4%	13.7%
Asian	3.0%	6.5%	2.9%	5.1%	1.5%	1.1%	4.8%
American Indian	0.3%	0.6%	0.0%	0.9%	0.1%	0.3%	0.3%
Other	2.5%	3.2%	1.5%	1.8%	6.0%	5.4%	2.7%

SOURCE: DP05 Demographic and Housing Estimates 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

City Demographics | Income

Warwick and Cranston exceed the State income percentages for households with $75,000 - $100,000 plus(+).

- In the U.S., low-income families ***with less than $15k in annual income have a 32% broadband adoption rate*** vs. 90% among families with income greater than $150k.
- In Providence ***62%*** of the households have incomes of $50k and less.
- The number of households with an income of $75k-$100k plus (+) is dramatically lower in Providence (22%), Pawtucket (22%) and Woonsocket(19%).

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Household Income							
< $25k	24.2%	36.9%	20.6%	22.3%	31.7%	28.2%	37.1%
$25 – 49k	22.1%	25.0%	21.8%	22.4%	30.0%	24.1%	24.8%
$50 – 74k	17.9%	16.1%	21.0%	19.1%	16.2%	18.2%	18.4%
$75 – 99k	13.5%	8.2%	15.8%	14.3%	11.2%	13.3%	9.9%
$100k +	22.3%	13.8%	20.8%	21.9%	10.9%	16.2%	9.8%

SOURCE: DP03 Selected Economic Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

City Demographics | Education Poverty Rate

Three cities – Providence, Pawtucket and Woonsocket – have the highest percentages of individuals living in poverty across all education levels.

- In Providence, 35% of individuals 18 and older who did not complete high school are living in poverty. This is 50% above the State average.
- Providence and Woonsocket have the largest percentages (24% and 20%) of those with some college or college degrees living in poverty.

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Poverty Rate by Education Level Achieved							
< High school	23.2%	34.7%	18.1%	19.4%	26.3%	13.7%	28.3%
High school	11.1%	22.3%	10.2%	8.5%	14.5%	7.4%	18.5%
Some college	7.3%	14.6%	5.5%	7.7%	10.6%	7.0%	15.7%
College +	4.1%	9.6%	2.8%	3.7%	6.8%	3.2%	4.2%

SOURCE: S1501 Educational Attainment 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

City Demographics | Birthplace

The number of foreign born individuals in the six cities ranges from 6% to 29%.

- Providence has the ***lowest*** number of US natives (71%) among the six largest cities.
- Providence and Pawtucket are roughly double the State average (13%) with ***foreign born*** individuals.

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Birthplace							
Born in US	87.3%	71.1%	93.9%	88.1%	75.8%	83.7%	90.9%
Foreign born	12.7%	28.9%	6.1%	11.9%	24.2%	16.3%	9.1%

SOURCE: DP02 Selected Social Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

City Demographics | School-Age Children

There is limited variation in the number of households with school-age children in the six cities, with Providence as the largest outlier.

- In the U.S. 86% of households with children used a computer vs. 73% of households without children.
- Providence has the lowest number of households with school-age kids among the six largest cities. Woonsocket has the highest (76%).
- Warwick, Pawtucket and East Providence are above the State average for households with school-age kids.

	RI	Provi-dence	Warwick	Cran-ston	Paw-tucket	East Prov	Woon-socket
Households with School-age Children							
School-age kids	59.0%	46.8%	62.2%	60.2%	67.0%	69.5%	76.5%

SOURCE: DP02 Selected Social Characteristics 2008-2010 3-Year American Community Survey Estimates, U.S. Census Bureau, October 2011.

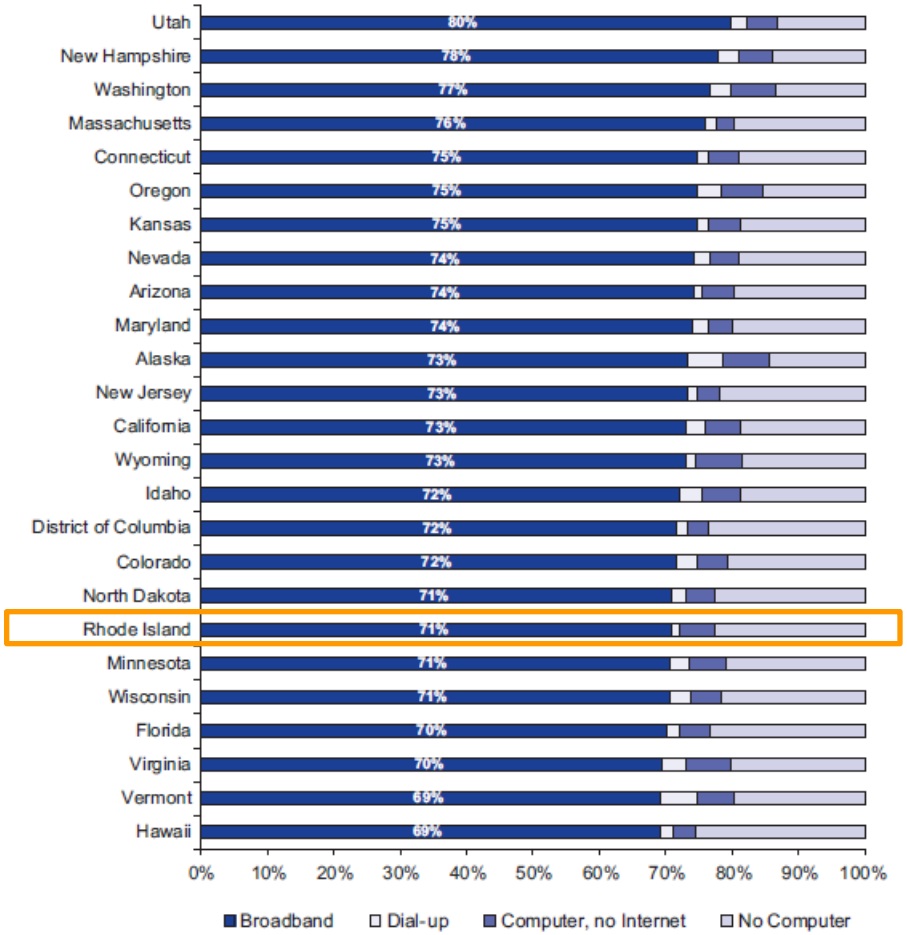
Adoption Data

If You Build It, Will They Come?

Issues associated with broadband adoption are known , yet strategies to drive universal adoption are complex.

- Of the top 25 States in the country for household broadband adoption, ***Rhode Island ranks 19th*** nationally at 71% and third in New England.
- Despite wide broadband coverage within the State, 30% of the State's residents are not using the internet.

Figure 12: Computer and Internet Use by State, 2010 (by Household Broadband Adoption Rate)



SOURCE: NTIA Exploring the Digital Nation - Computer and Internet Use at Home November 2011

Factors Correlated With Broadband Adoption

NTIA and Pew Research have identified several factors that correlate with broadband adoption.

Factors in order of importance:

Education	The greater the education level attained, the higher the broadband adoption rate
Income and Employment	Increased levels of household income and employment contribute to a higher adoption rate
Ethnicity/Race	Whites and Asians have a higher rate of adoption rate than African Americans and Hispanics
Age	The adoption rate increases through age 47 and then begins to decline
School-age children in household	The presence of school-age children increases likelihood of adoption rate
Disability	The adoption rate declines if the householder is disabled
Metro area	Urban households have a higher adoption rate than rural ones
Foreign born	Foreign born residents have a lower adoption rate than natives
Household Size	The adoption rate increases with the size of the household

Sources: NTIA, Pew Internet Project April 2009 tracking survey

Profiles | Hypothetical Adoption Rates

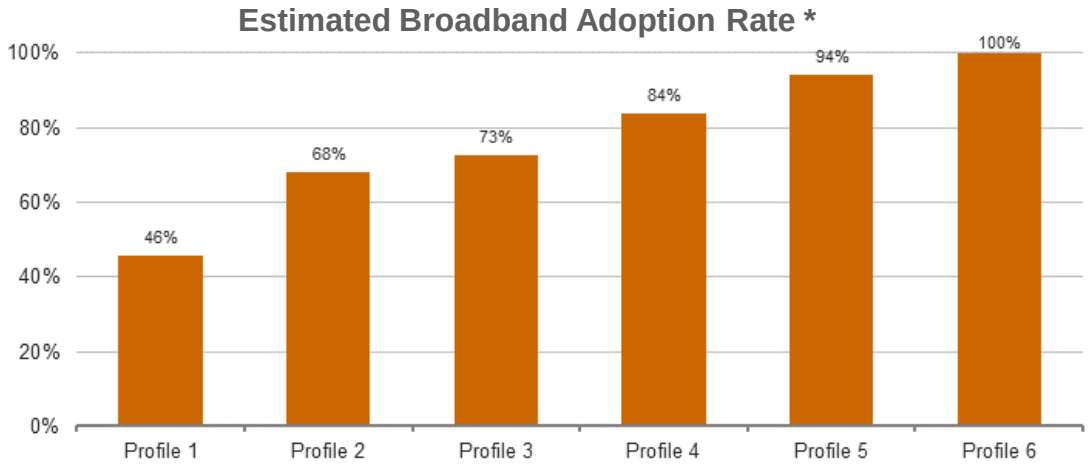
To demonstrate how estimated broadband adoption rates could be applied in Rhode Island, we identified six hypothetical U.S. national household profiles by varying key factors such as ethnicity, income, and education.

Specifically we:

- Leveraged NTIA's 2010 broadband study which performed a regression analysis on 54,000 U.S. households to determine which factors drove broadband adoption and to what degree (See Appendix B)
- Used the U.S. sample which had a larger sample size vs. the Rhode Island data (965 households)
- Held certain factors constant for purposes of our analysis - age (30), metro area (urban), and disability (not disabled)

Profiles | Hypothetical Adoption Rates

We applied the NTIA U.S. based regression coefficients to estimate the adoption rate for each hypothetical profile. These profiles provide a view of the likely adoption rates for the corresponding demographic profiles in Rhode Island.



Ethnicity	Hispanic or Black	Hispanic or Black	Hispanic or Black	White	Hispanic or Black	Any ethnicity
Income	< $25k	$25-50k	$25-50k	$25-50k	$25-50k	$100k+
Education	No H.School	High School	High School	High School	High School	College
Age	30	30	30	30	30	30
Household size	2	2	2	2	4	2
Foreign born	No	Yes	No	No	No	No
School-age children	No	No	No	No	Yes	No

* Average estimated adoption rate based on NTIA regression coefficients, excluding confidence intervals
SOURCE: "Exploring the Digital Nation, Computer and Internet Use at Home", National Telecommunications and Information Administration (NTIA), November 2011

Community Observations

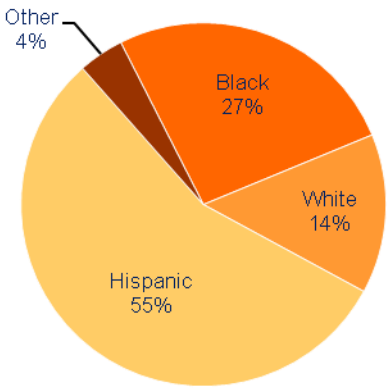
Participants | Who They Are

Sixty-five RI residents (65) from four urban-based community organizations with limited to no use of broadband services were interviewed about their broadband access, usage and online value perceptions.

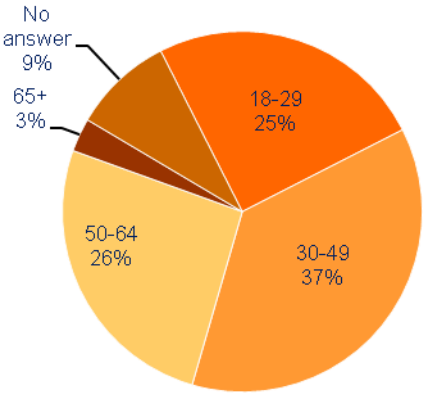
Most of the participants rely on community organization services and represent an urban, lower-income minority-based segment of the population.

Participant profile:

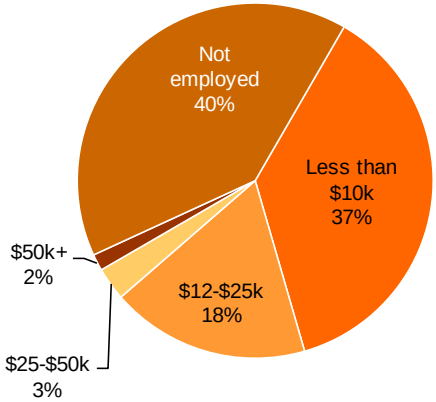
Race



Age



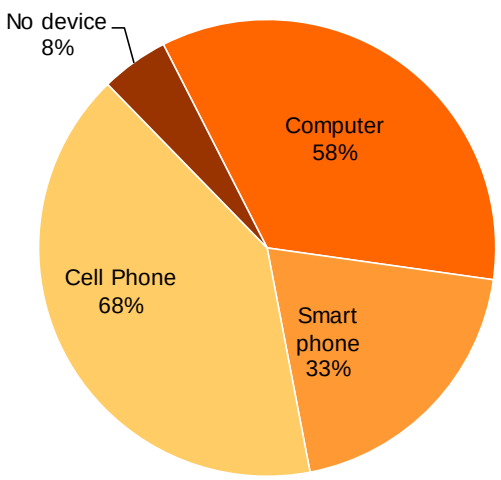
Income



Participants| Device Ownership

Residents were asked a series of questions aimed at understanding their technology and broadband usage and access profiles.

- ***58%*** had computers at home; ***68%*** owned cell phones and ***34%*** owned smartphones (Pew estimates 84% of all adults own cell phones and 35% smartphones).
- 8% of participants did not own a cell phone and 32% did not own a computer. (10% did not respond).
- 5% of cell phone owners had phones via ***Assurance Wireless (Lifeline)*** and ***Cintex Wireless,*** companies who offer phones to those receiving government assistance *



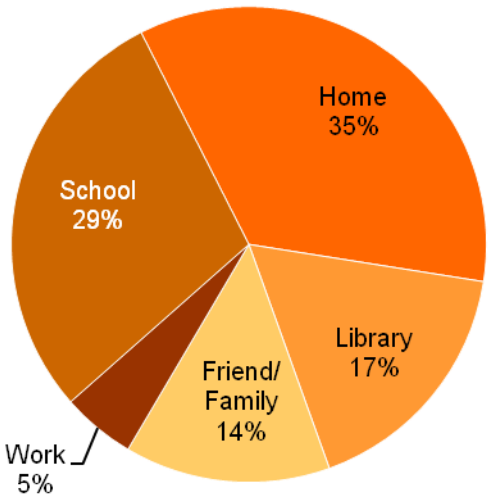
* Available for those participating in one or more of the following government programs: Medicaid, Food Stamps/SNAP, General Public Assistance, Supplemental Security Income (SSI), Temporary Assistance to Needy Families (TANF), Low-Income Home Energy Assistance Program (LIHEAP), Rhode Island Medical Assistance Program, Rhode Island Pharmaceutical Assistance to the Elderly, Family Independence Program (FIP)

Participants | Broadband Access

Only 35% of participants had broadband access at home, which is approximately half the average Rhode Island adoption rate.

- 17% had broadband access at home with the majority via cable (8) and (3) via fiber.
- 34% have smartphones with 54% of those individuals having broadband access at home (12); 14% still had landline phones but no DSL service.
- 64% had broadband access ***via home and school*** with libraries and friends/family coming a close third in gaining broadband access outside of the home.
- 17% (11) had no internet use at all.

Broadband access



Online Information Preferences

When asked if they had a broadband connection at home and which online *content* would provide them with the most value, participants responded as follows:

1. ***Job Search***
2. ***Health Information***
3. ***Craigslist***
4. Other- Social Media (FB, YouTube, email)
5. School Info
6. Projo, CNN, News
7. Community Happenings

- The majority of respondents welcome the opportunity to not only look for jobs but to read and learn about opportunities to assist them in developing new skills.
- It was felt that access to online health information could alleviate the need to go to a doctor as well as improve home care by providing information about illness and potential remedies.
- There was an interest in keeping current via news, but many felt there were many other options to receive this information.

Online Transaction Preferences

When asked if they had a broadband connection at home and which online *transactions* would provide them with the most value and interest, participants responded as follows:

1. ***Online course work***
2. ***DMV registrations (Department of Motor Vehicles)***
3. ***Shopping (eCommerce)***
4. Scheduling Doctor/Dentist appointments
5. Government Services
6. Bus Tickets/Travel services
7. Language translations (Spanish)

- The opportunity to learn via online course work was overwhelmingly embraced. Challenges associated with transportation, child care and traditional course expense were cited as key barriers to pursuing traditional school work.
- Time savings associated with DMV registration and other car related activities online was extremely popular.
- Purchasing of music, movies and selected retail was ranked high as well as the ability to schedule Doctor and Dentist appointments.
- ***Other transactions*** that merited interest by 15% of the audience was the ability to ***pay bills***; ***schedule day care***; receive funds and purchase prepaid gas cards for cars.

Reasons for Not Using Broadband Internet

In 2010 ***Pew's Research Center's Internet & American Life Project*** conducted a broad survey sample of 2,200 adults to understand why people did not use broadband internet. Many of the reasons they identified were similar in responses we received in our community observations.

The biggest differences were in the areas of relevance and usability. While we are uncertain of the exact reasons for the divergence, it could be attributed to sample size, composition of participant profiles or geographies. In general:

- There was agreement between expense and lack of computer equipment as critical reasons for lack of adoption, as both ranked in the top 3 in both studies.
- There was also agreement that the lack of knowledge (digital literacy) about both computers and the Internet (too hard and don't know how) were key barriers for both audiences.
- Where Pew noted relevancy as the main reason for adoption, it ranked substantially lower in the RI community observations placing at number 5, where expense and lack of equipment ranked number 1 and 2.
- RI observations also noted that ***ID theft,*** which includes theft of family and bank information, as a key deterrent in going online.
- Finally, in Rhode Island the absence of Spanish language instruction to assist in the education of community members was a challenge for many participants with limited or little understanding of English.

Reasons for Not Using Broadband Internet continued

Pew Research : Main reasons for not using the internet

21% of adult Americans do not use the internet; these are the factors they cite as their main reason for not doing so

Just not interested	31%
Don't have a computer	12%
Too expensive	10%
Too difficult/frustrating	9%
Think it's a waste of time	7%
Don’t have access	6%
Too busy/don't have the time	6%
Don't need/want it	4%
Too old to learn	4%
Just don't know how	2%
Physically unable	2%
Worried about viruses/spam/spyware	1%
Other	6%

C Squared Strategy: Main reasons for RI urban participants not using broadband/internet

100% response rate n=65 adults ; 62% between 18-49 years old; 38% between 50 – 65+ years old; 81% Hispanic/Black; 14% White

Too expensive	**46%**
Don't have a computer	**32%**
Just don't know how	**31%**
ID Theft	**30%**
Don’t have access	17%
Don't need/want it	14%
Too hard	20%
Language issues (Spanish)	18%

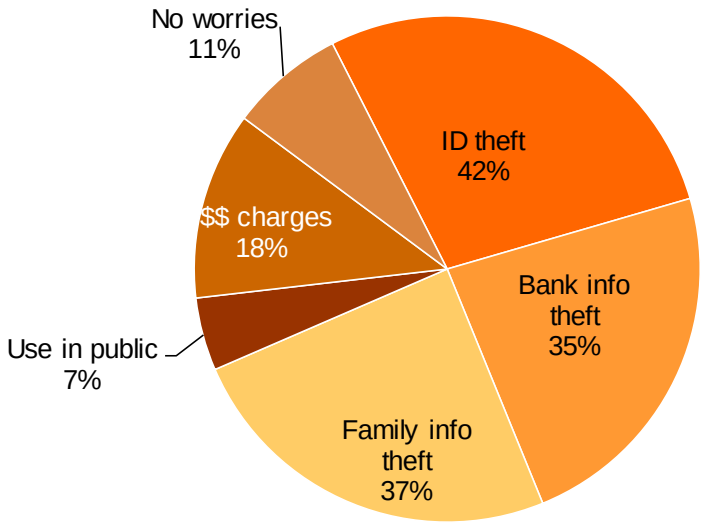
SOURCES: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey. N=2,252 adults 18 and older; C Squared Strategy RI Community Observations December 2011-February 2012

Online Issues

Participants expressed that there were several barriers to subscribing to broadband other than expense.

- The majority of respondents (42%) who do not have broadband at home were concerned about ID theft followed by theft of family info (37%) and bank information (35%).
- Many felt that more education regarding identification theft precautions and appropriate responses to online theft would be helpful.

RI Community Online Concerns

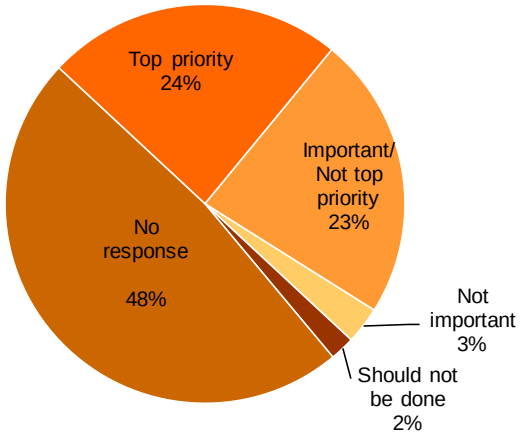


Government Role

There are many similarities with Pew and RI responses regarding the role of government and broadband.

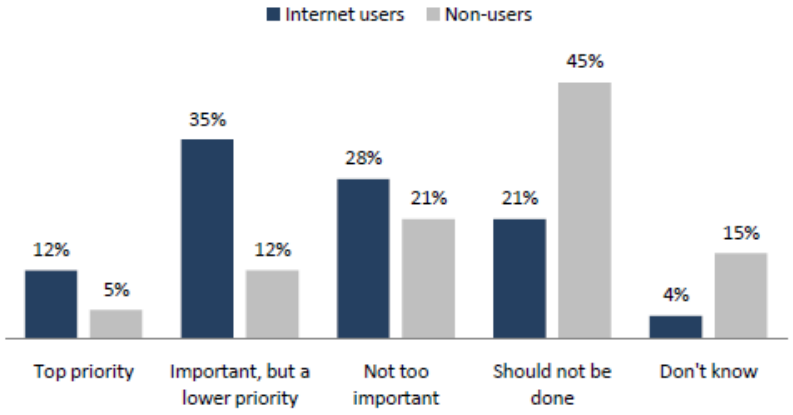
- When asked what role government should play in advancing affordable broadband, of the RI respondents 24% thought it should be a top priority and 23%felt it was important but not a top priority.
- Pew sampling of government advocacy found 12% saw it as a top priority and 35% as important but not a top priority.

RI Community Responses



Non-internet users view expansion of broadband access as a low priority

% within each group who say that expanding affordable high-speed internet access is...



Source: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey. N=2,252 adults 18 and older.

Next Steps

Next Steps

- Validate data with existing BBRI information
- Apply adoption profile information at a State and local level
- Apply GIS (geographic information system) views of targeted areas (See Appendix D)
- Prioritize urban communities as digital literacy targets based on community profiles
- Emphasize bi-lingual and Spanish translation in digital literacy for targeted populations
- Analyze urban literacy initiatives in MA and CT for similar sized cities including provider financial incentives
- Identify RI rural areas as areas for study and analysis
- Review Providence Plan data to determine how adoption insights match their neighborhood analysis and patterns of resident migration
- Meet with broadband providers and use adoption research as leverage to gain access to household information
- Explore Comcast Internet Essentials program framework or similar frameworks and applicability for RI

C Squared Strategy
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Appendices

Appendix A | Sources

- Pew Internet & American Life Project – Home Broadband - A. Smith August 11, 2010
- Exploring the Digital Nation – Computer and Internet Use at Home – NTIA November 2011
- U.S. Census – 2008-1010 American Community Survey 3-Year Data
- U.S. Census – 2006-2010 American Community Survey 5 –Year Data
  - BO1001 – Sex by Age- Universe: Total population
  - BO1003 – Total population – Universe: Total population
  - B05002 – Place of birth by citizenship
  - DP02 – Selected social characteristics in the United States
  - DP03 – Selected economic characteristics
  - DP04 – Selected Housing characteristics
  - DP05 – Demographic and housing estimates
  - S0101 – Age and sex
  - S1201 – Marital status
  - S1501 – Educational attainment
  - S2303 – Work status in the past 12 months
  - S2409 – Class of worker by sex and median earnings in past 12 months
- The Economic Impact of Broadband June 2011 - Broadband Rhode Island RIEDC
- Broadband Report – March 2010 - Federal Communications Commission

Appendix B | NTIA Regression Analysis

Regression coefficients from the NTIA national broadband adoption study "Exploring the Digital Nation", Table B4, November 2011. The regression is based on a sample of 54,269 and has an R Squared of 0.276 and confidence interval of 90%

Regression Factor	Weighting	Standard Error +/- **
Household Income:		
▪ Less than $25,000	--	--
▪ $25,000 - 49,999	0.1368	0.006
▪ $50,000 – 74,999	0.2156	0.007
▪ $75,000 – 99,999	0.2403	0.007
▪ $100,000 or more	0.2460	0.007
Education:		
▪ No high school diploma	--	--
▪ High school diploma	0.1320	0.008
▪ Some college	0.2465	0.008
▪ College degree or more	0.3048	0.008
Age	0.0093	0.001
Age Squared	-0.0001	--
# Persons in household	0.0470	0.002
Has school-age children	0.1217	0.014
# in household/school-age children interaction	-0.0396	0.004

Regression Factor	Weighting	Standard Error +/- **
Race		
▪ White, non-Hispanic	--	--
▪ Black, non-Hispanic	-0.1099	0.007
▪ Hispanic	-0.1096	0.008
▪ Asian, non-Hispanic	-0.0052	0.010
▪ Other, non-Hispanic	-0.0529	0.014
Disability:		
▪ Disability	-0.0634	0.007
▪ Disability not identified	0.1065	0.020
Foreign-born non-citizen	-0.0473	0.010
Metro area:		
▪ Rural	--	--
▪ Urban	0.0528	0.006
▪ Metro area not identified	0.0617	0.023
Constant	0.0641	0.026

** Represents standard error for a 90% confidence interval
SOURCE: "Exploring the Digital Nation, Computer and Internet Use at Home", National Telecommunications and Information Administration (NTIA), November 2011

Appendix C | Key Definitions

Broadband service: The provision, on either a commercial or non-commercial basis, of data transmission technology that provides two way data transmission to and from the Internet with advertised speeds of at least 768 kbps downstream and greater than 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area (768 kbps/200 kbps). (FCC Broadband 2010)

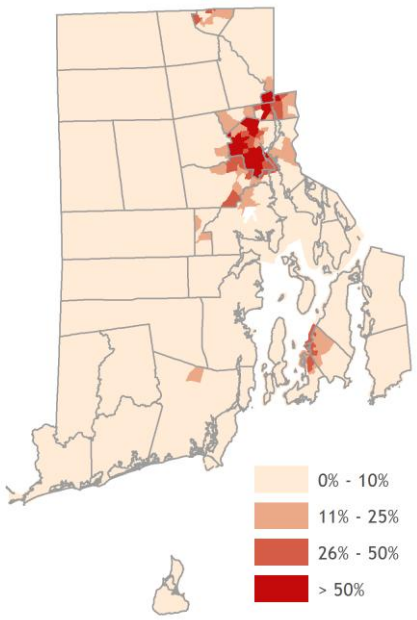
Digital Literacy: An individual's ability to locate, organize, understand, evaluate and analyze information using digital technology

Appendix D | Sample GIS Views of Key Demographic Attributes

We have constructed a map of three key demographic factors that affect adoption.

Ethnicity:

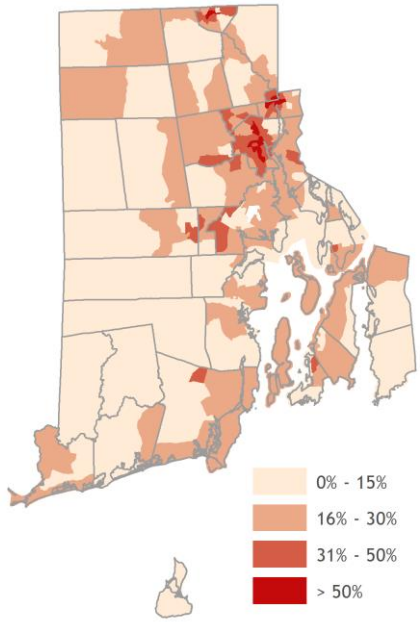
% of total RI population that are of Hispanic or Latino origin or are of Black or African American race



SOURCE: " B03002: HISPANIC OR LATINO ORIGIN BY RACE - Universe: Total population " 2006-2010 5-Year American Community Survey Estimates, U.S. Census Bureau, December 2011.

Income:

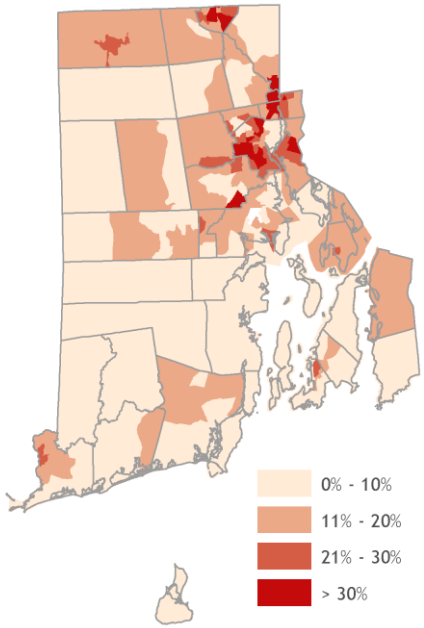
% of total RI households that have an annual household income of less than $25,000



SOURCE: " B19001: HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS) - Universe: Households " 2006-2010 5-Year American Community Survey Estimates, U.S. Census Bureau, December 2011.

Education:

% of total RI population 18 years and older that have reached a total educational attainment of less than a high school diploma or equivalency



SOURCE: " S1501: EDUCATIONAL ATTAINMENT " 2006-2010 5-Year American Community Survey Estimates, U.S. Census Bureau, December 2011.